Title: He I 1083 as a unsaturated Hanle diagnostic of the magnetic field in CMEs

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The He I 1083 is an important atomic multiplet commonly observed in the active chromosphere and solar prominences. In eruptive prominences observed at large coronal heights, when the magnetic field drops below a few gauss, the linear polarization of He I 1083 becomes sensitive to the magnetic field via the unsaturated Hanle effect. This work shows how linear polarization observations of He I 1083 can be used to infer the direction of the longitudinal magnetic field in CMEs. To accomplish this goal, we developed a numerical framework capable of computing the polarization signals of the He I 1083 from realistic MHD models of prominence eruptions. The code can treat general magnetic regimes, ranging from zero field strength to the complete Paschen–Back effect, and can accept any atomic structure satisfying the Russell–Saunders (LS) coupling scheme, including atoms with nonzero nuclear spin (hyperfine structure). We use the prominence MHD eruption models from Fan (2018) as the basis for this study, where we show how the derived integrated linear polarization signals from different vantage points could be used for inferring the magnetic field of the eruption. We further discuss the observability of these diagnostics, following the work of Molnar and Casini (2024).